10 years of coordinated study of honey bee colony loss rates – presentation of a COLOSS core project.

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The COLOSS history of collecting and analyzing data on honey bee colony losses extends back to 2009, when a coordinated approach involving twelve European countries was undertaken to better understand colony losses. This group developed a standardized questionnaire to ask beekeepers about their hive management and overwintering success. This crowd-sourcing approach expanded to more countries over time and as of recent years is now regularly applied through annual surveys in about 30 countries, including some from outside Europe. The response rate varies greatly between countries, being more than ten percent of beekeepers in several countries. For winter 2016/17, for example, 27 European countries plus Algeria, Israel and Mexico collected data from 14,813 beekeepers who collectively wintered 425,762 colonies. Colony losses can be divided into colonies lost as live colonies with unsolvable queen problems, colonies lost due to natural disaster and dead colonies (or empty hives) after winter. The sum of these three categories suggests an overall loss rate of 20.9% (95% confidence interval: 20.6-21.3%) of honey bee colonies during winter 2016/17, with marked differences among countries. The data obtained is used in single factor quasi-binomial GzLMs to model probability of loss. In several years we identified operation size as a risk factor for winter colony losses, with smaller operations experiencing higher losses than larger ones ($p<0.001$). On the other hand, overall analysis of the 2016/17 data showed that migratory beekeeping had no significant effect on the risk of winter loss, though there was an effect in several countries. At the conference first results for winter 2017/18 will be presented, from data which to a great extent were collected via a common online survey. These results will include the effects of several different forage sources.